FIG. 1

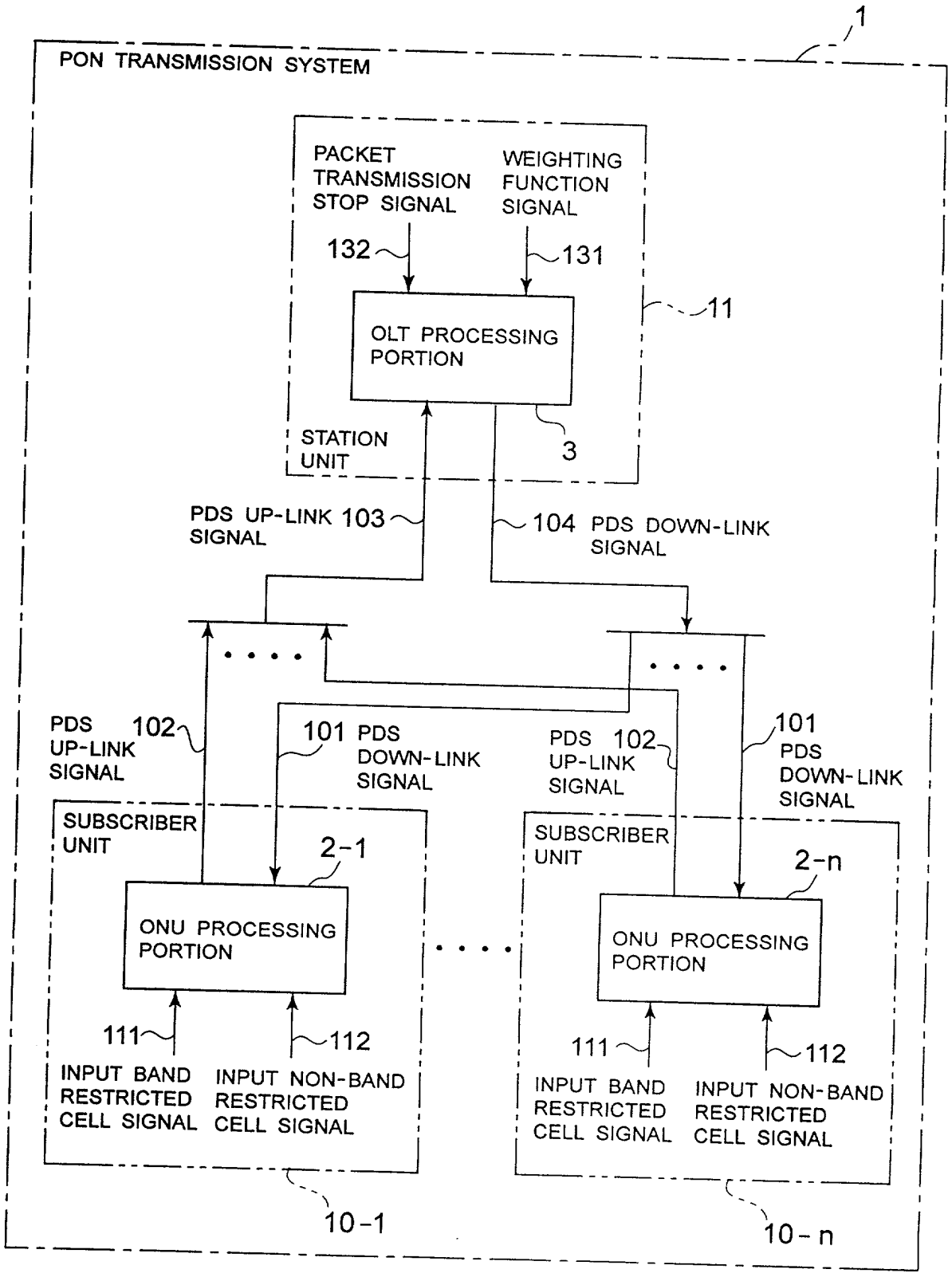

1
PON TRANSMISSION SYSTEM
PACKET TRANSMISSION STOP SIGNAL
WEIGHTING FUNCTION SIGNAL
132
131
OLT PROCESSING PORTION
11
3
STATION UNIT
PDS UP-LINK SIGNAL
103
104
PDS DOWN-LINK SIGNAL
PDS UP-LINK SIGNAL
102
101
PDS DOWN-LINK SIGNAL
PDS UP-LINK SIGNAL
102
101
PDS DOWN-LINK SIGNAL
SUBSCRIBER UNIT
2-1
ONU PROCESSING PORTION
111
112
INPUT BAND RESTRICTED CELL SIGNAL
INPUT NON-BAND RESTRICTED CELL SIGNAL
10-1
SUBSCRIBER UNIT
2-n
ONU PROCESSING PORTION
111
112
INPUT BAND RESTRICTED CELL SIGNAL
INPUT NON-BAND RESTRICTED CELL SIGNAL
10-n

FIG. 2

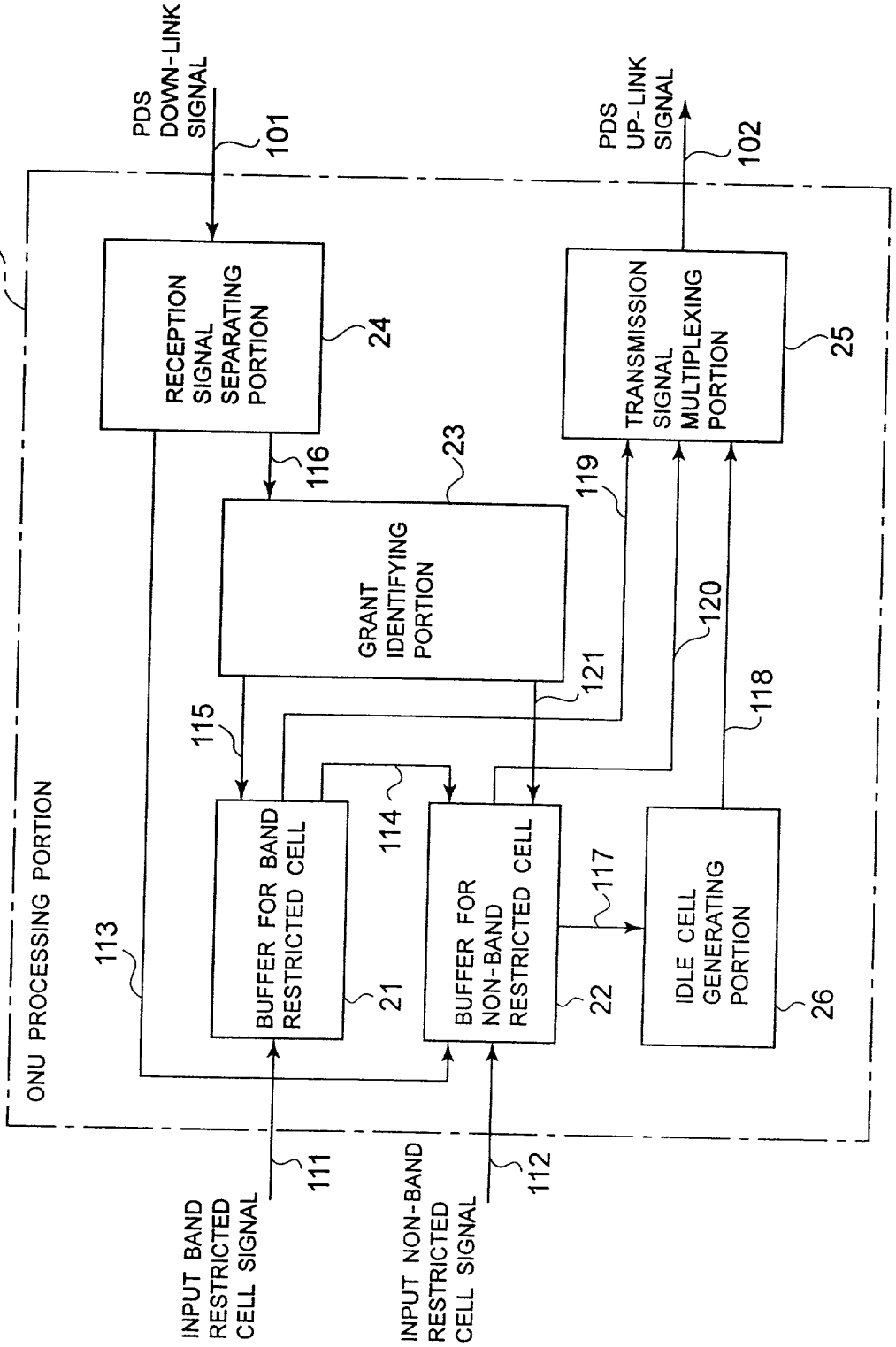

PDS DOWN-LINK SIGNAL
101
PDS UP-LINK SIGNAL
102
2
ONU PROCESSING PORTION
RECEPTION SIGNAL SEPARATING PORTION
24
TRANSMISSION SIGNAL MULTIPLEXING PORTION
25
GRANT IDENTIFYING PORTION
23
116
119
120
121
115
118
113
114
117
BUFFER FOR BAND RESTRICTED CELL
21
BUFFER FOR NON-BAND RESTRICTED CELL
22
IDLE CELL GENERATING PORTION
26
111
112
INPUT BAND RESTRICTED CELL SIGNAL
INPUT NON-BAND RESTRICTED CELL SIGNAL

FIG.3

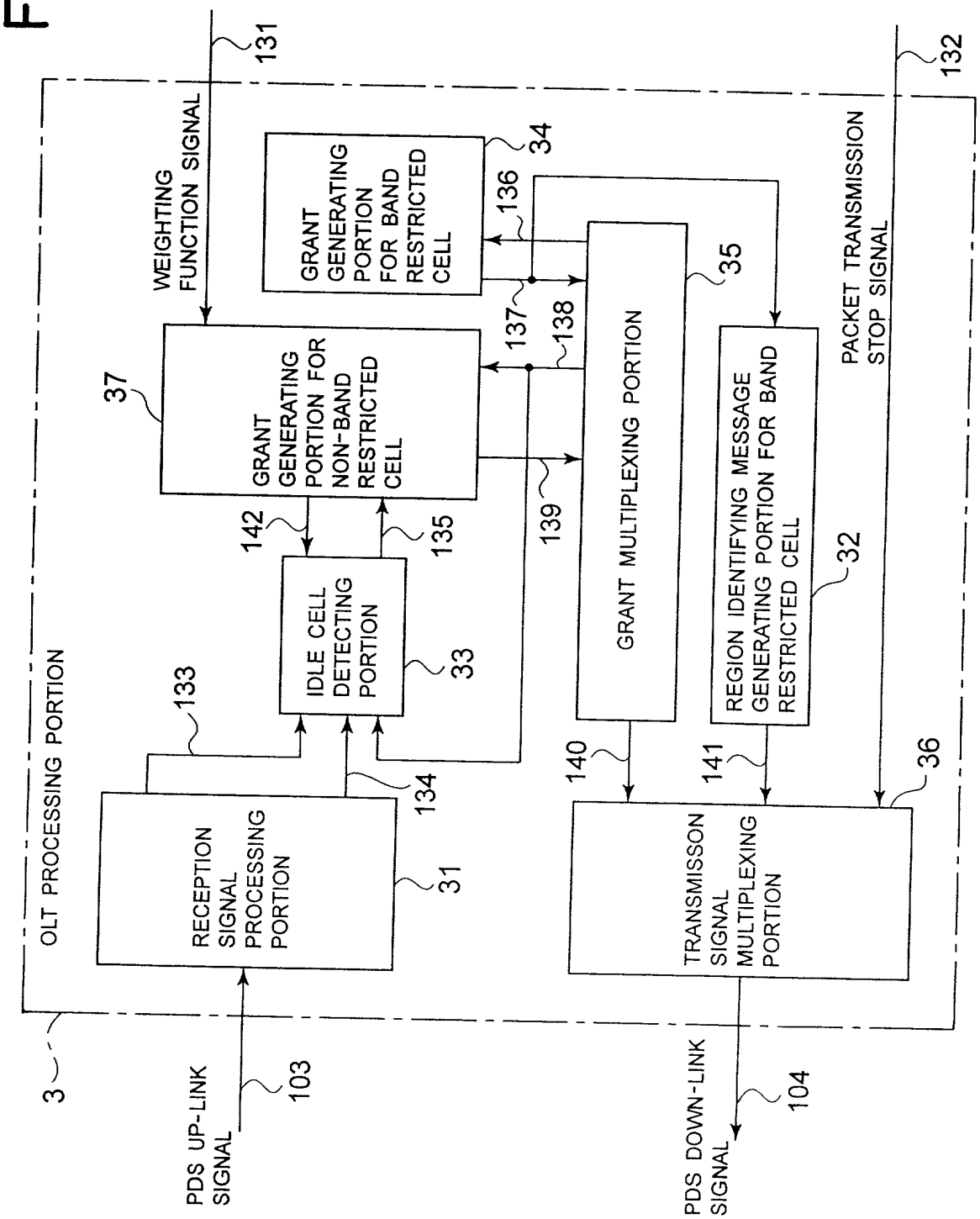

OLT PROCESSING PORTION
3
131
WEIGHTING FUNCTION SIGNAL
132
PACKET TRANSMISSION STOP SIGNAL
GRANT GENERATING PORTION FOR BAND RESTRICTED CELL
34
136
137
138
35
GRANT GENERATING PORTION FOR NON-BAND RESTRICTED CELL
37
142
135
139
GRANT MULTIPLEXING PORTION
IDLE CELL DETECTING PORTION
33
133
REGION IDENTIFYING MESSAGE GENERATING PORTION FOR BAND RESTRICTED CELL
32
140
141
36
134
RECEPTION SIGNAL PROCESSING PORTION
31
TRANSMISSON SIGNAL MULTIPLEXING PORTION
PDS UP-LINK SIGNAL
103
PDS DOWN-LINK SIGNAL
104

FIG. 4

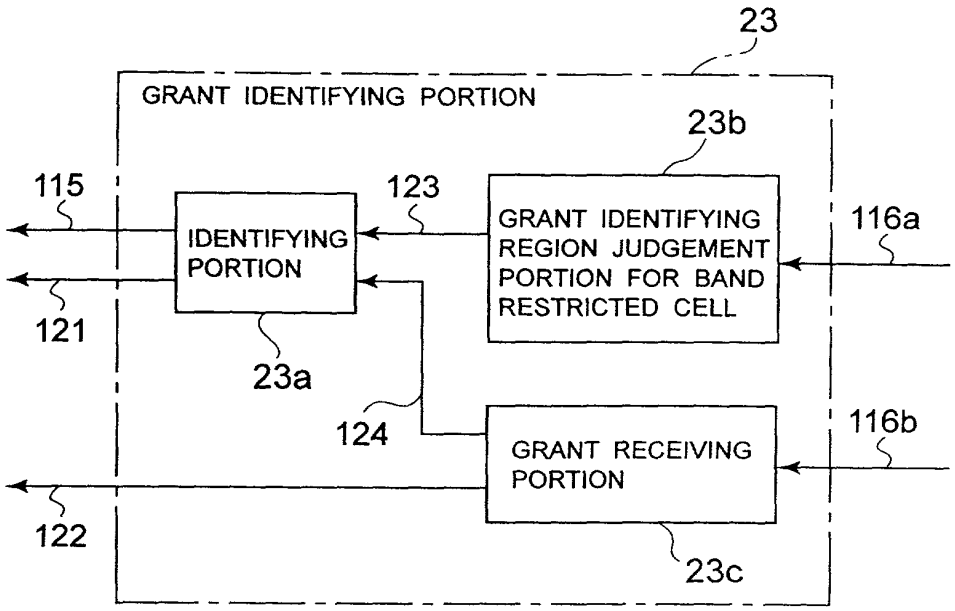

23
GRANT IDENTIFYING PORTION
23b
115
123
IDENTIFYING PORTION
GRANT IDENTIFYING REGION JUDGEMENT PORTION FOR BAND RESTRICTED CELL
116a
121
23a
124
GRANT RECEIVING PORTION
116b
122
23c

FIG. 5

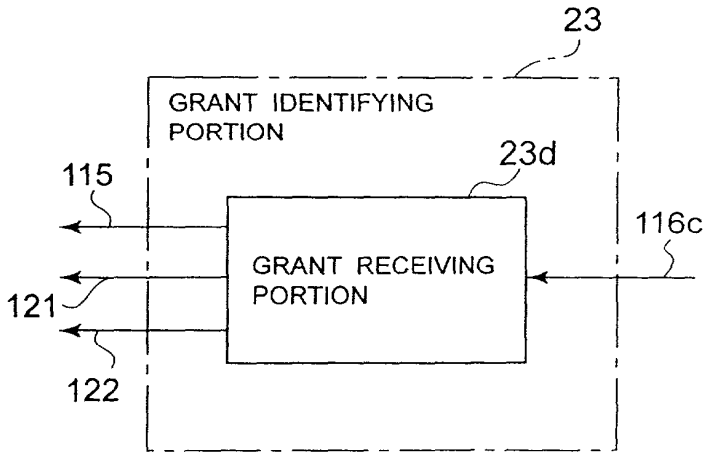

23
GRANT IDENTIFYING PORTION
23d
115
GRANT RECEIVING PORTION
116c
121
122

FIG. 6

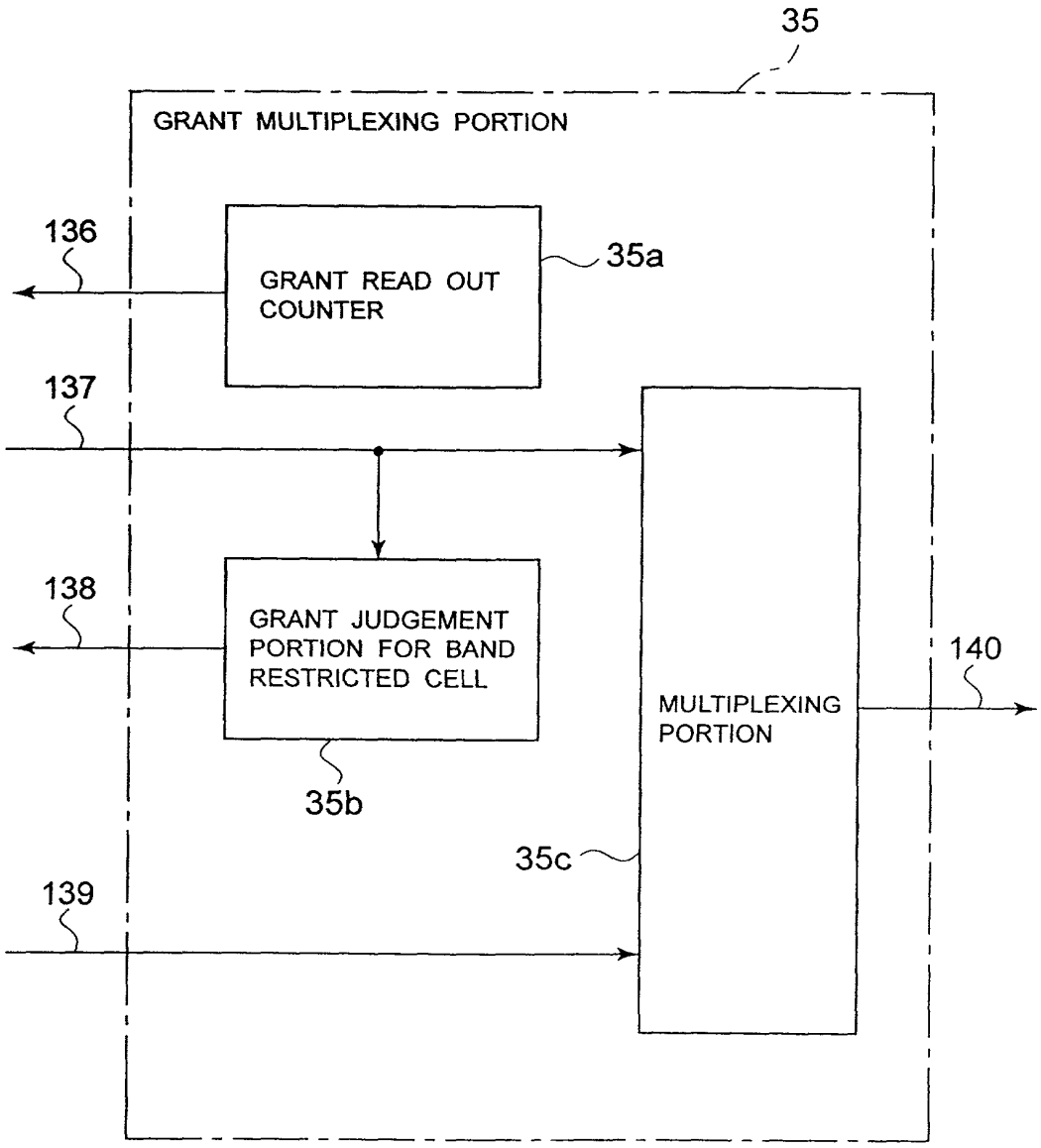

35
GRANT MULTIPLEXING PORTION
136
GRANT READ OUT COUNTER
35a
137
138
GRANT JUDGEMENT PORTION FOR BAND RESTRICTED CELL
35b
MULTIPLEXING PORTION
140
35c
139

FIG. 7

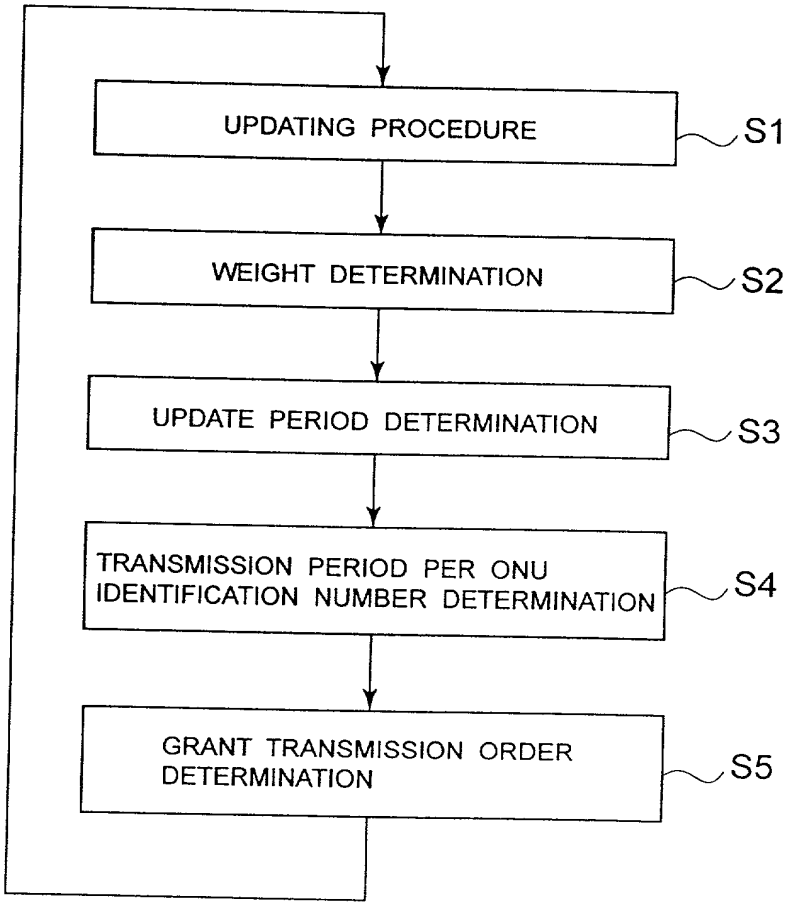

UPDATING PROCEDURE
S1
WEIGHT DETERMINATION
S2
UPDATE PERIOD DETERMINATION
S3
TRANSMISSION PERIOD PER ONU IDENTIFICATION NUMBER DETERMINATION
S4
GRANT TRANSMISSION ORDER DETERMINATION
S5

FIG. 8

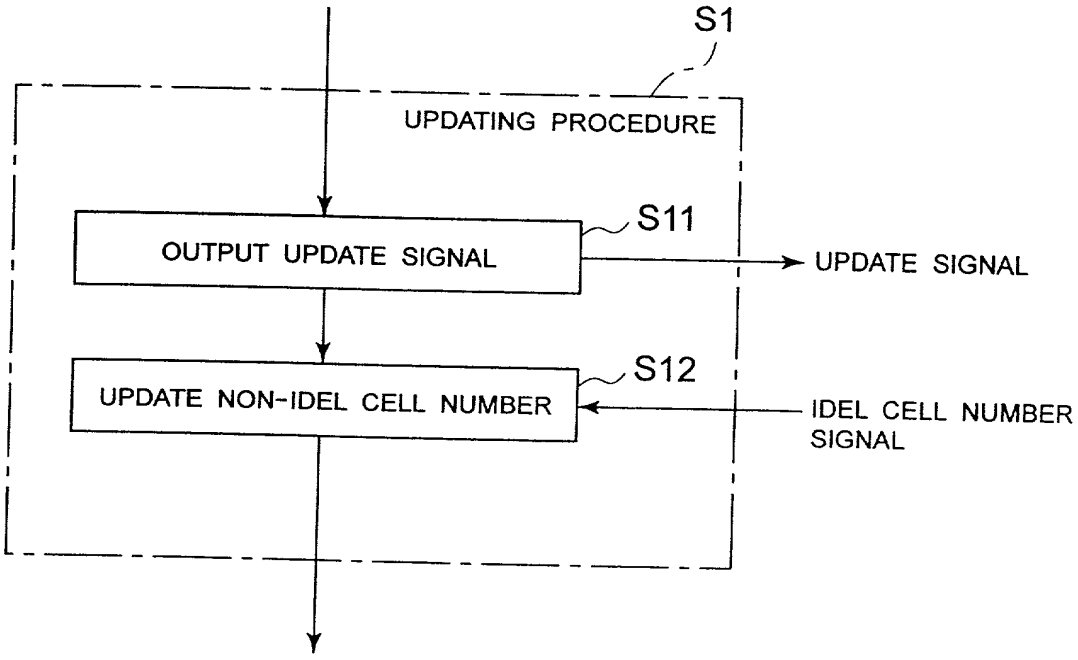

S1
UPDATING PROCEDURE
S11
OUTPUT UPDATE SIGNAL
UPDATE SIGNAL
S12
UPDATE NON-IDEL CELL NUMBER
IDEL CELL NUMBER SIGNAL

FIG. 9

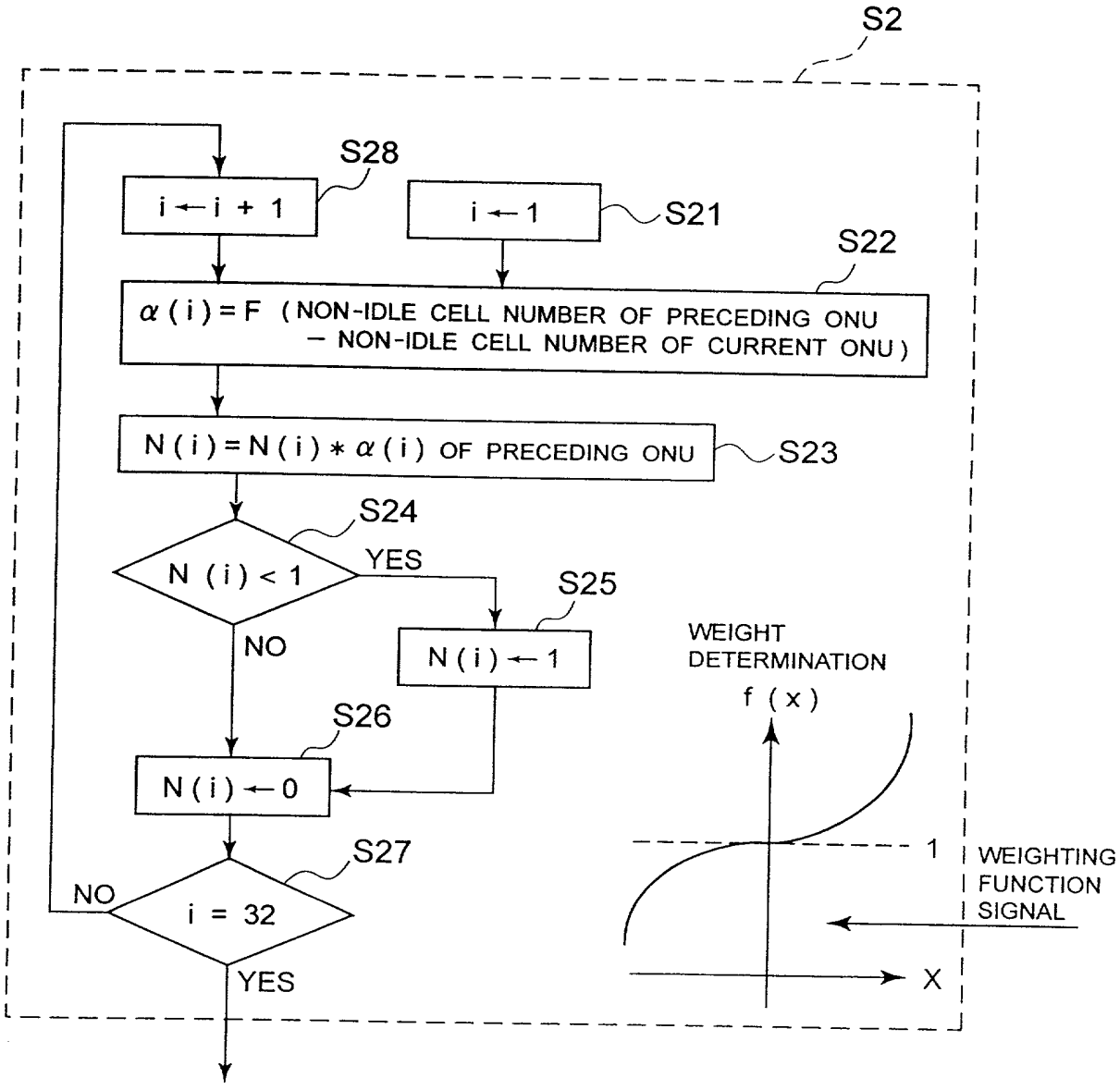

S2
S28
i ← i + 1
i ← 1
S21
S22
α (i) = F (NON-IDLE CELL NUMBER OF PRECEDING ONU − NON-IDLE CELL NUMBER OF CURRENT ONU)
N (i) = N (i) * α (i) OF PRECEDING ONU
S23
S24
N (i) < 1
YES
S25
NO
N (i) ← 1
S26
N (i) ← 0
S27
NO
i = 32
YES
WEIGHT DETERMINATION
f (x)
1
WEIGHTING FUNCTION SIGNAL
X

FIG.10

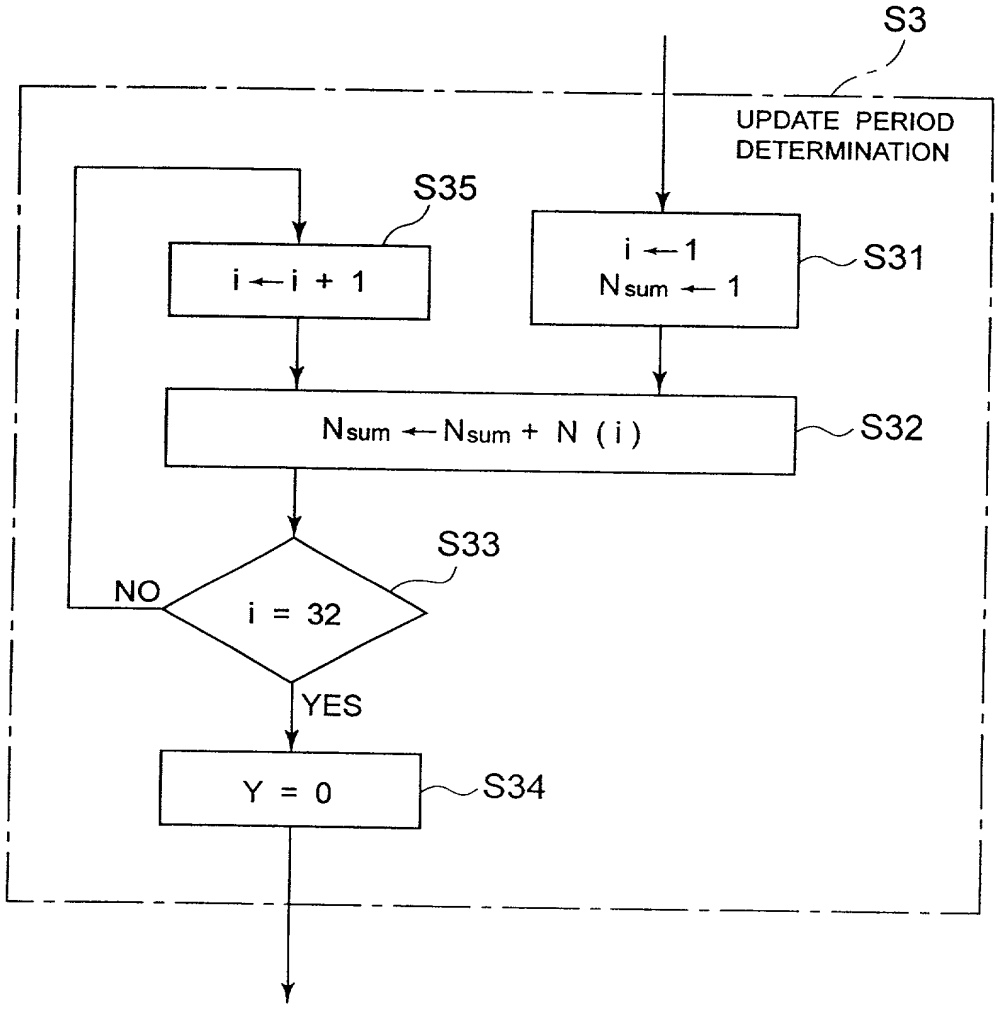

S3
UPDATE PERIOD DETERMINATION
S35
i ← i + 1
i ← 1
Nsum ← 1
S31
Nsum ← Nsum + N (i)
S32
S33
NO
i = 32
YES
Y = 0
S34

FIG.11

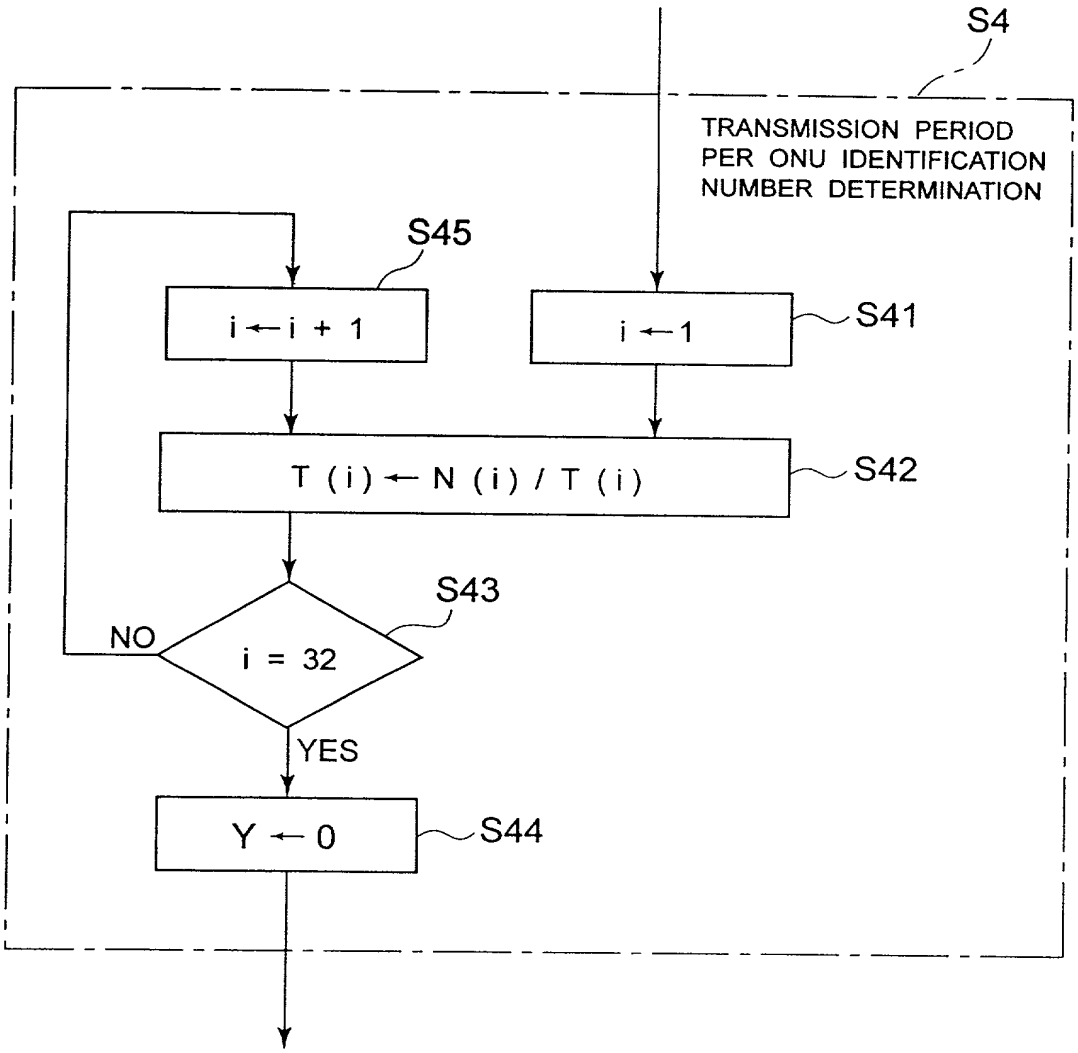

S4
TRANSMISSION PERIOD PER ONU IDENTIFICATION NUMBER DETERMINATION
S45
i ← i + 1
i ← 1
S41
T (i) ← N (i) / T (i)
S42
S43
NO
i = 32
YES
Y ← 0
S44

FIG.12

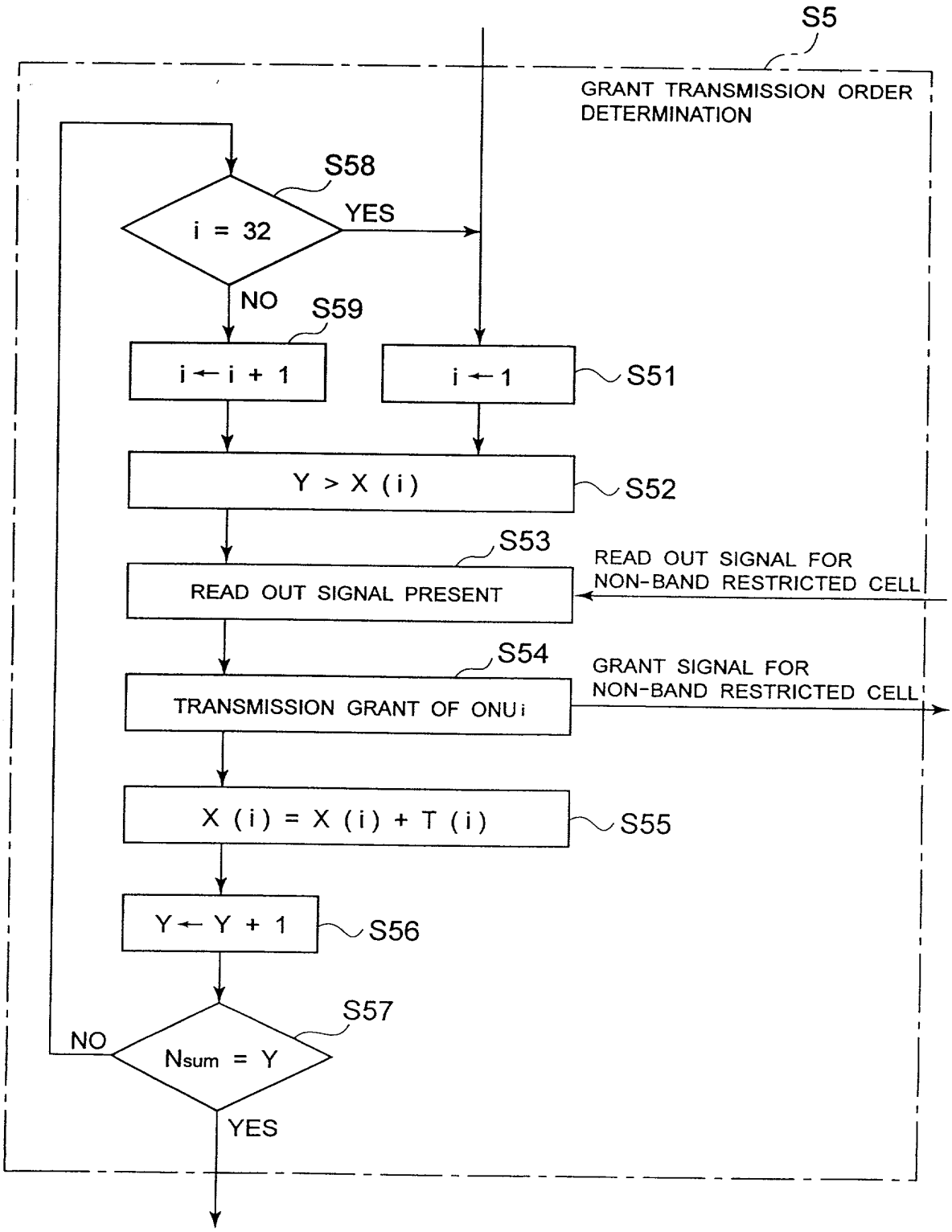
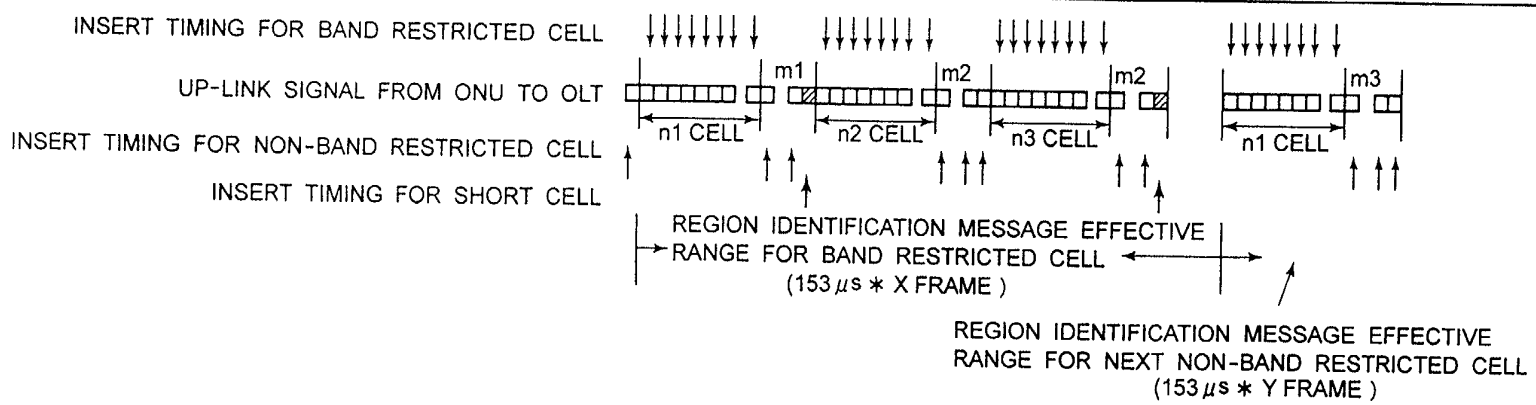

S5
GRANT TRANSMISSION ORDER DETERMINATION
S58
i = 32
YES
NO
S59
i ← i + 1
i ← 1
S51
Y > X (i)
S52
S53
READ OUT SIGNAL PRESENT
READ OUT SIGNAL FOR NON-BAND RESTRICTED CELL
S54
TRANSMISSION GRANT OF ONUi
GRANT SIGNAL FOR NON-BAND RESTRICTED CELL
X (i) = X (i) + T (i)
S55
Y ← Y + 1
S56
S57
NO
Nsum = Y
YES

FIG.13

VENDOR_SPECIFIC MESSAGE		
OCTET	CONTENTS	DESCRIPTION
35	Xxxxxxxx	INDICATES ONU SOURCING THIS MESSAGE
36	01111zzz	MESSAGE INDENTIFICATION "VENDER_SPECIFIC"
37	n1	NUMBER OF REGION FOR BAND RESTRICTED CELL
38	m1	NUMBER OF REGION FOR NON-BAND RESTRICTED CELL
39	n2	NUMBER OF REGION FOR BAND RESTRICTED CELL
40	m2	NUMBER OF REGION FOR NON-BAND RESTRICTED CELL
41	n3	NUMBER OF REGION FOR BAND RESTRICTED CELL
42	m3	NUMBER OF REGION FOR NON-BAND RESTRICTED CELL
43	n4	NUMBER OF REGION FOR BAND RESTRICTED CELL
44	m4	NUMBER OF REGION FOR NON-BAND RESTRICTED CELL
45	00000000	COMMAND REPEATING
46	UNSPECIFIED	



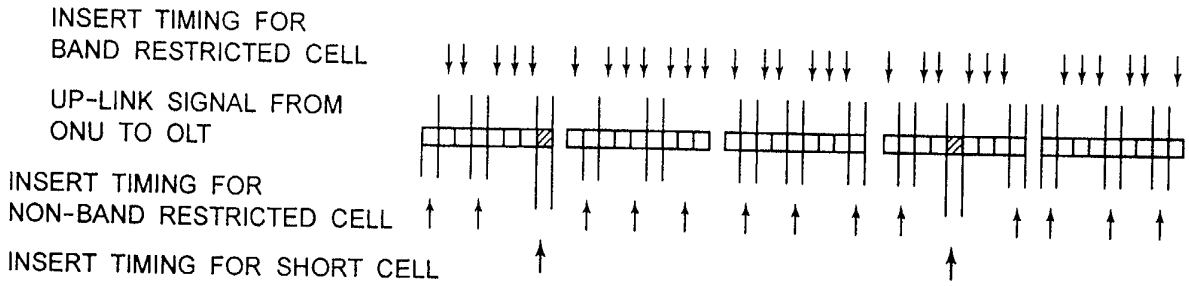
FOREIGN 92092660

FIG.14

GRANT_ALLOCATION MESSAGE		
OCTET	CONTENT	DESCRIPTION
35	PON_ID	DIRECTED MESSAGE TO ONE ONU
36	00001010	MESSAGE IDENTIFICATION "GRANT_ALLOCATION"
37	dddddddd	DATA GRANT ALLOCATED TO THE ONU WITH THIS PON_ID
38	0000000a	a:1 = ACTIVATE DATA GRANT FOR THIS ONU a:0 = DEACTIVATE DATA GRANT FOR THIS ONU
39	pppppppp	PLOAM GRANT ALLOCATED TO THE ONU WITH THIS PON_ID
40	0000000a	a:1 = ACTIVATE PLOAM GRANT FOR THIS ONU a:0 = DEACTIVATE PLOAM GRANT FOR THIS ONU
41	dddddddd	DATA GRANT ALLOCATED TO THE ONU WITH THIS PON_ID
42	0000000a	a:1 = ACTIVATE DATA GRANT FOR THIS ONU a:0 = DEACTIVATE DATA GRANT FOR THIS ONU
43, 46	UNSPECIFIED	

GRANT FOR BAND RESTRICTED CELL

GRANT FOR NON-BAND RESTRICTED CELL



Naoki SAIKUSA
"Pon Transmission System . . ."
Q62732
Filed January 17, 2001

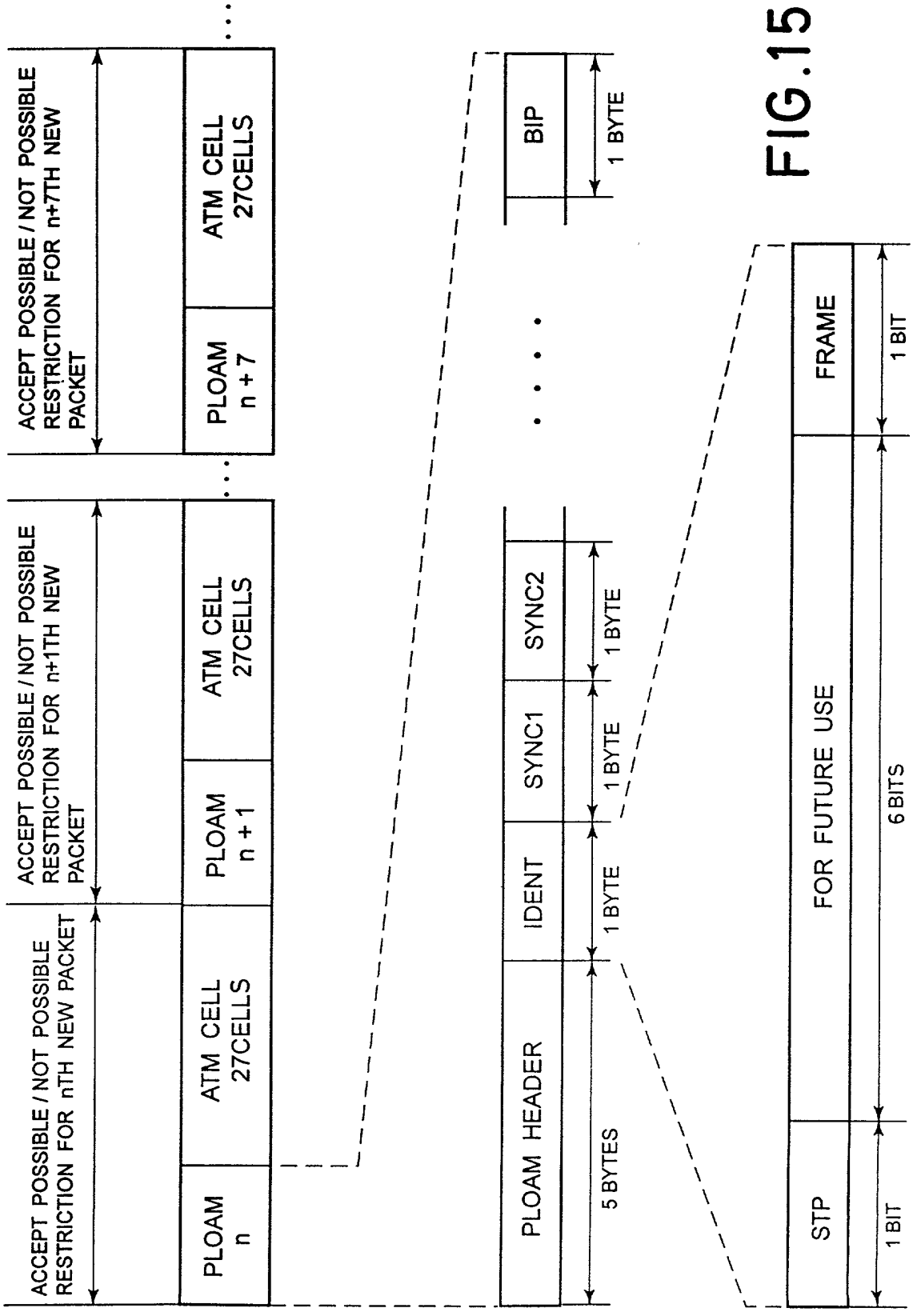

ACCEPT POSSIBLE / NOT POSSIBLE RESTRICTION FOR nTH NEW PACKET
PLOAM n
ATM CELL 27CELLS
ACCEPT POSSIBLE / NOT POSSIBLE RESTRICTION FOR n+1TH NEW PACKET
PLOAM n + 1
ATM CELL 27CELLS
ACCEPT POSSIBLE / NOT POSSIBLE RESTRICTION FOR n+7TH NEW PACKET
PLOAM n + 7
ATM CELL 27CELLS
PLOAM HEADER
5 BYTES
IDENT
1 BYTE
SYNC1
1 BYTE
SYNC2
1 BYTE
BIP
1 BYTE
STP
1 BIT
FOR FUTURE USE
6 BITS
FRAME
1 BIT

FIG.15

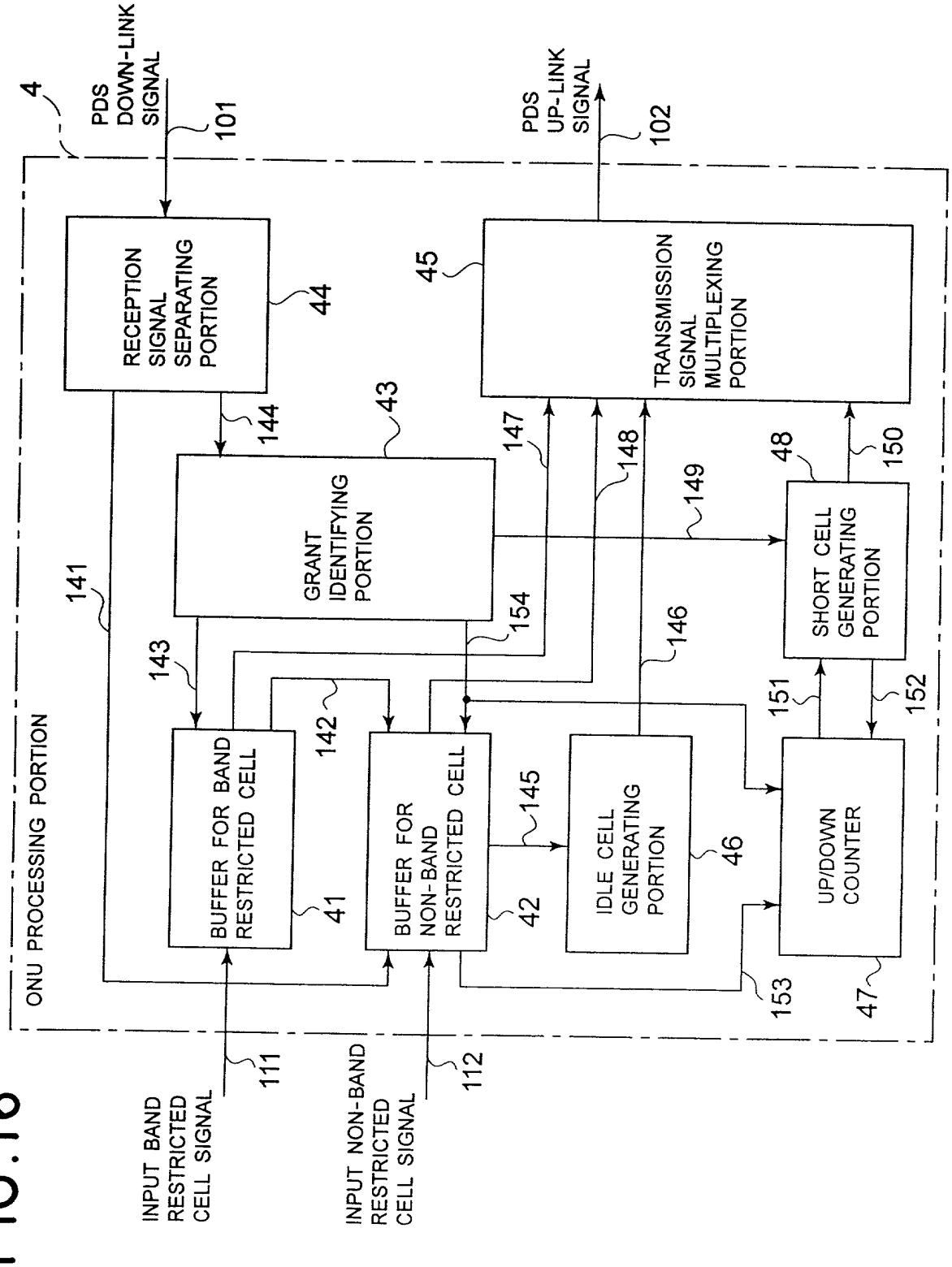

4
PDS DOWN-LINK SIGNAL
101
PDS UP-LINK SIGNAL
102
RECEPTION SIGNAL SEPARATING PORTION
44
TRANSMISSION SIGNAL MULTIPLEXING PORTION
45
GRANT IDENTIFYING PORTION
43
144
147
148
149
48
150
SHORT CELL GENERATING PORTION
141
143
142
146
154
151
152
BUFFER FOR BAND RESTRICTED CELL
41
BUFFER FOR NON-BAND RESTRICTED CELL
42
145
IDLE CELL GENERATING PORTION
46
UP/DOWN COUNTER
47
153
ONU PROCESSING PORTION
INPUT BAND RESTRICTED CELL SIGNAL
111
INPUT NON-BAND RESTRICTED CELL SIGNAL
112

FIG.16

FIG.17

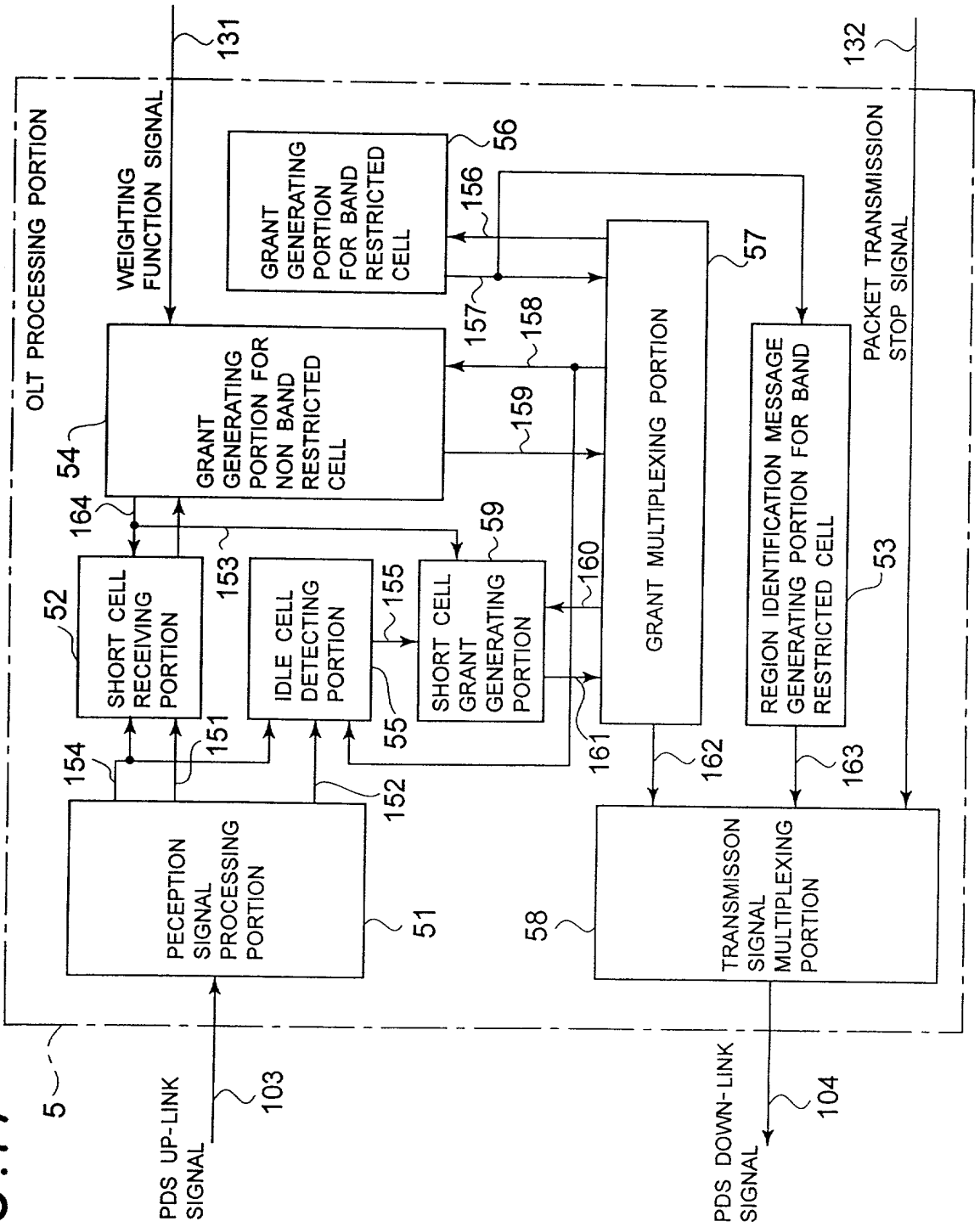

OLT PROCESSING PORTION
WEIGHTING FUNCTION SIGNAL
131
132
PACKET TRANSMISSION STOP SIGNAL
GRANT GENERATING PORTION FOR BAND RESTRICTED CELL
56
GRANT GENERATING PORTION FOR NON BAND RESTRICTED CELL
54
GRANT MULTIPLEXING PORTION
57
REGION IDENTIFICATION MESSAGE GENERATING PORTION FOR BAND RESTRICTED CELL
53
SHORT CELL RECEIVING PORTION
52
IDLE CELL DETECTING PORTION
SHORT CELL GRANT GENERATING PORTION
59
PECEPTION SIGNAL PROCESSING PORTION
51
TRANSMISSON SIGNAL MULTIPLEXING PORTION
58
151
152
153
154
155
156
157
158
159
160
161
162
163
164
5
PDS UP-LINK SIGNAL
103
PDS DOWN-LINK SIGNAL
104

FIG.18

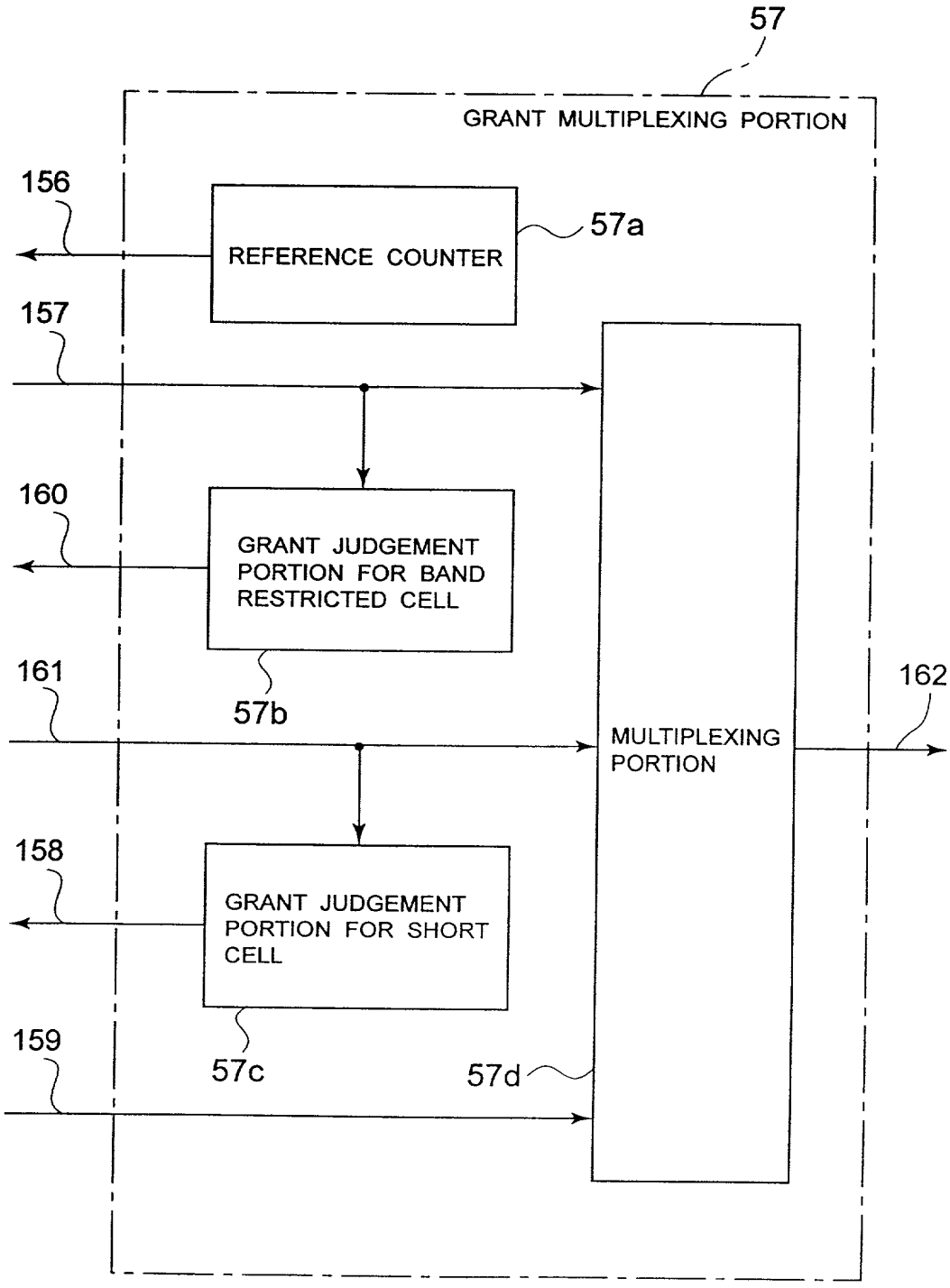

57
GRANT MULTIPLEXING PORTION
156
REFERENCE COUNTER
57a
157
160
GRANT JUDGEMENT PORTION FOR BAND RESTRICTED CELL
57b
161
162
MULTIPLEXING PORTION
158
GRANT JUDGEMENT PORTION FOR SHORT CELL
159
57c
57d

FIG.19

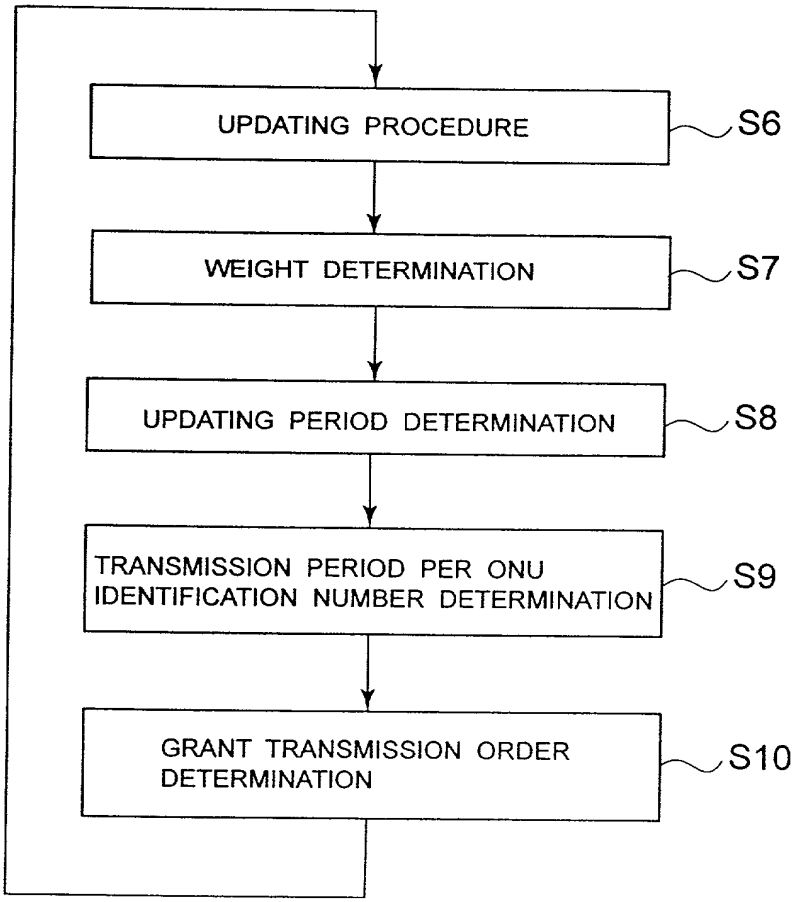

UPDATING PROCEDURE
S6
WEIGHT DETERMINATION
S7
UPDATING PERIOD DETERMINATION
S8
TRANSMISSION PERIOD PER ONU IDENTIFICATION NUMBER DETERMINATION
S9
GRANT TRANSMISSION ORDER DETERMINATION
S10

FIG. 20

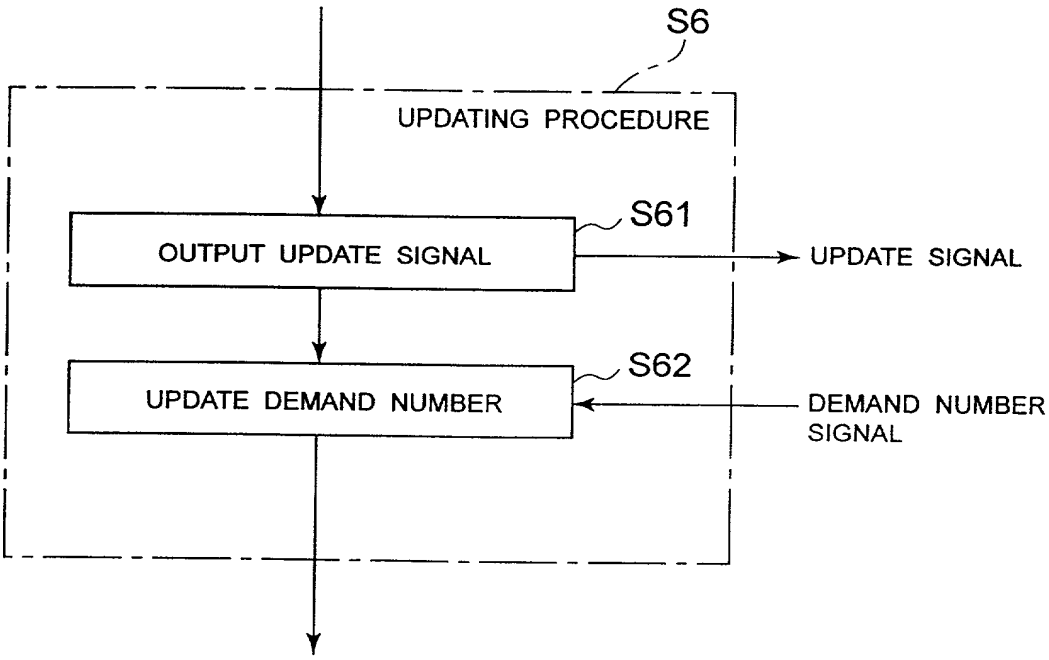

S6
UPDATING PROCEDURE
S61
OUTPUT UPDATE SIGNAL
UPDATE SIGNAL
S62
UPDATE DEMAND NUMBER
DEMAND NUMBER SIGNAL

FIG. 21

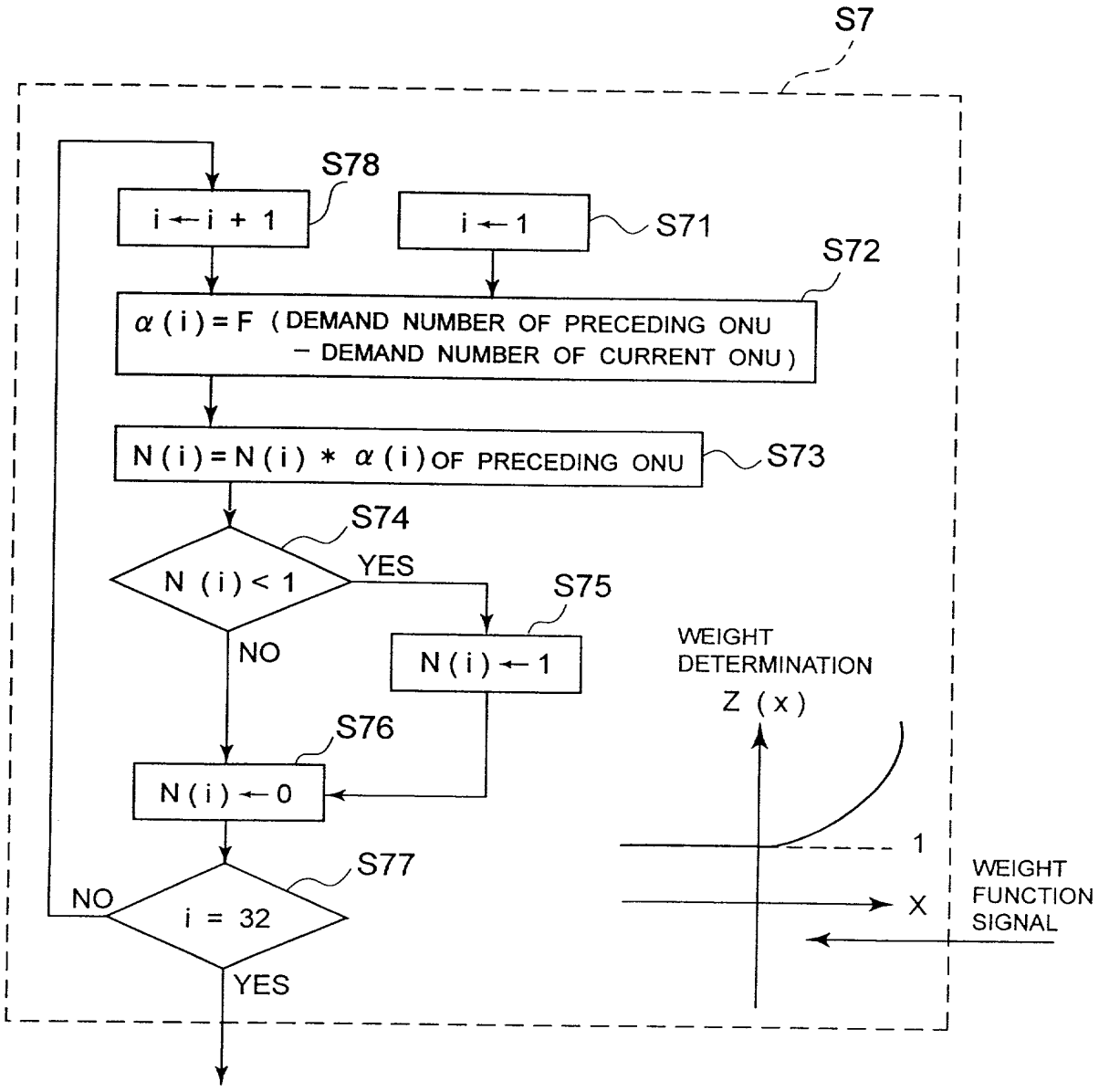

S7
S78
i ← i + 1
i ← 1
S71
S72
α (i) = F (DEMAND NUMBER OF PRECEDING ONU
− DEMAND NUMBER OF CURRENT ONU)
N (i) = N (i) * α (i) OF PRECEDING ONU
S73
S74
N (i) < 1
YES
S75
NO
N (i) ← 1
S76
N (i) ← 0
S77
NO
i = 32
YES
WEIGHT
DETERMINATION
Z (x)
1
X
WEIGHT
FUNCTION
SIGNAL

FIG. 22

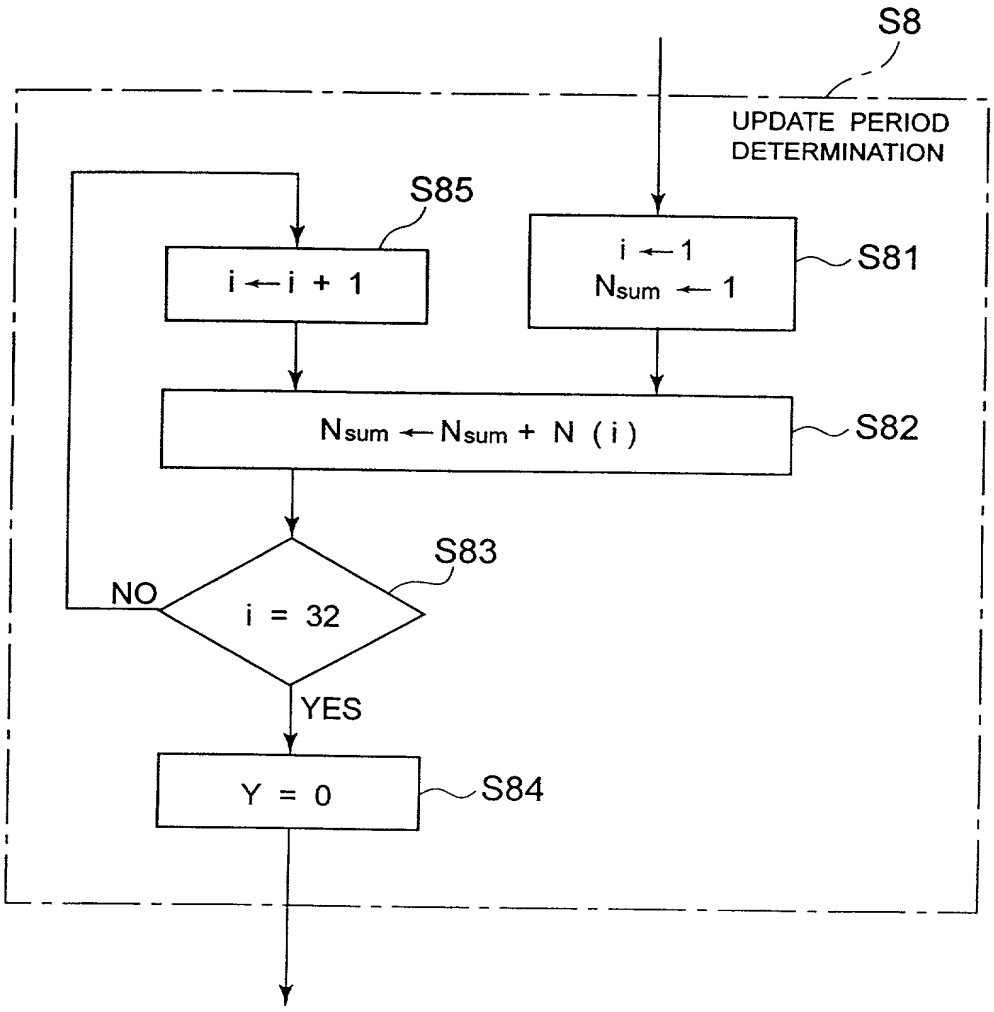

S8
UPDATE PERIOD DETERMINATION
S85
i ← i + 1
i ← 1
Nsum ← 1
S81
Nsum ← Nsum + N (i)
S82
S83
NO
i = 32
YES
Y = 0
S84

FIG. 23

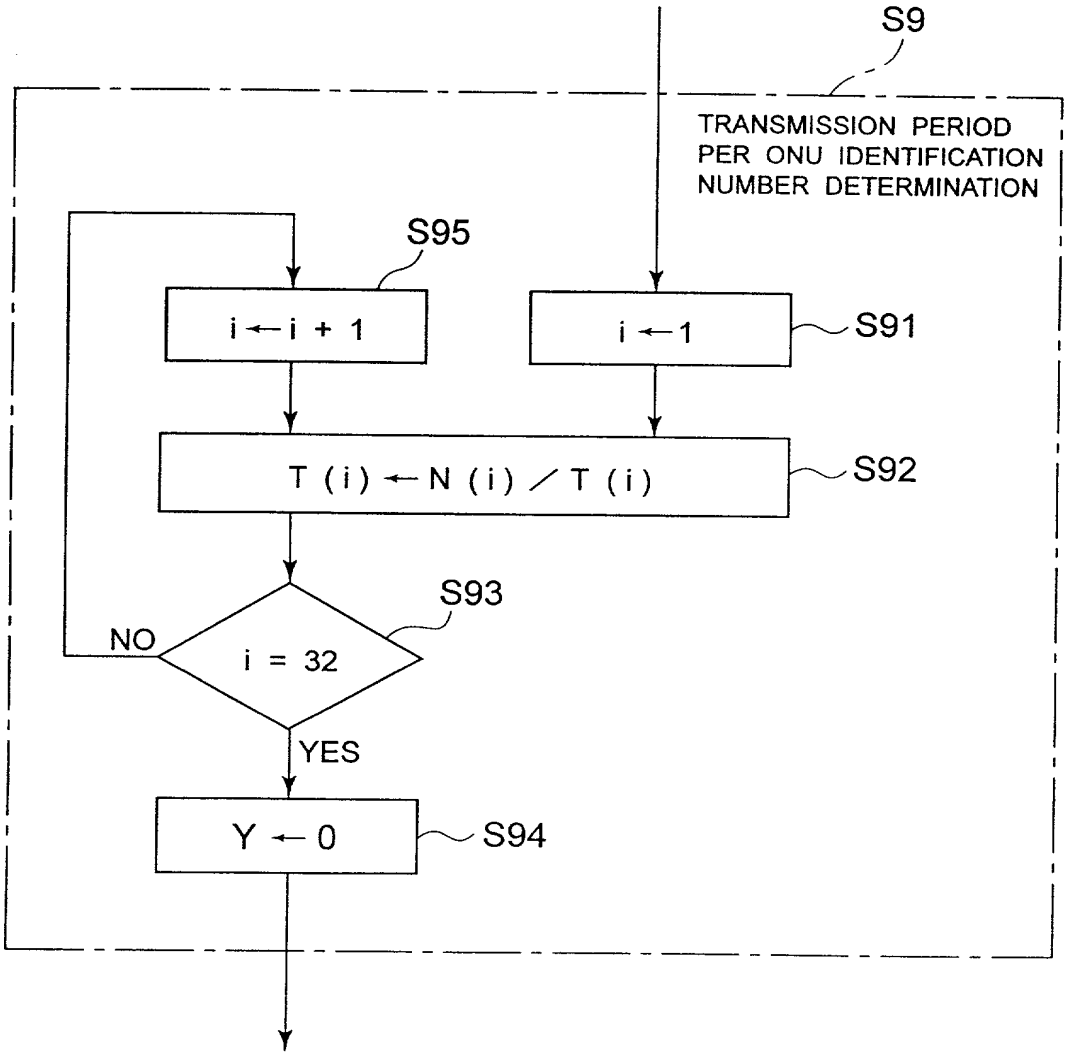
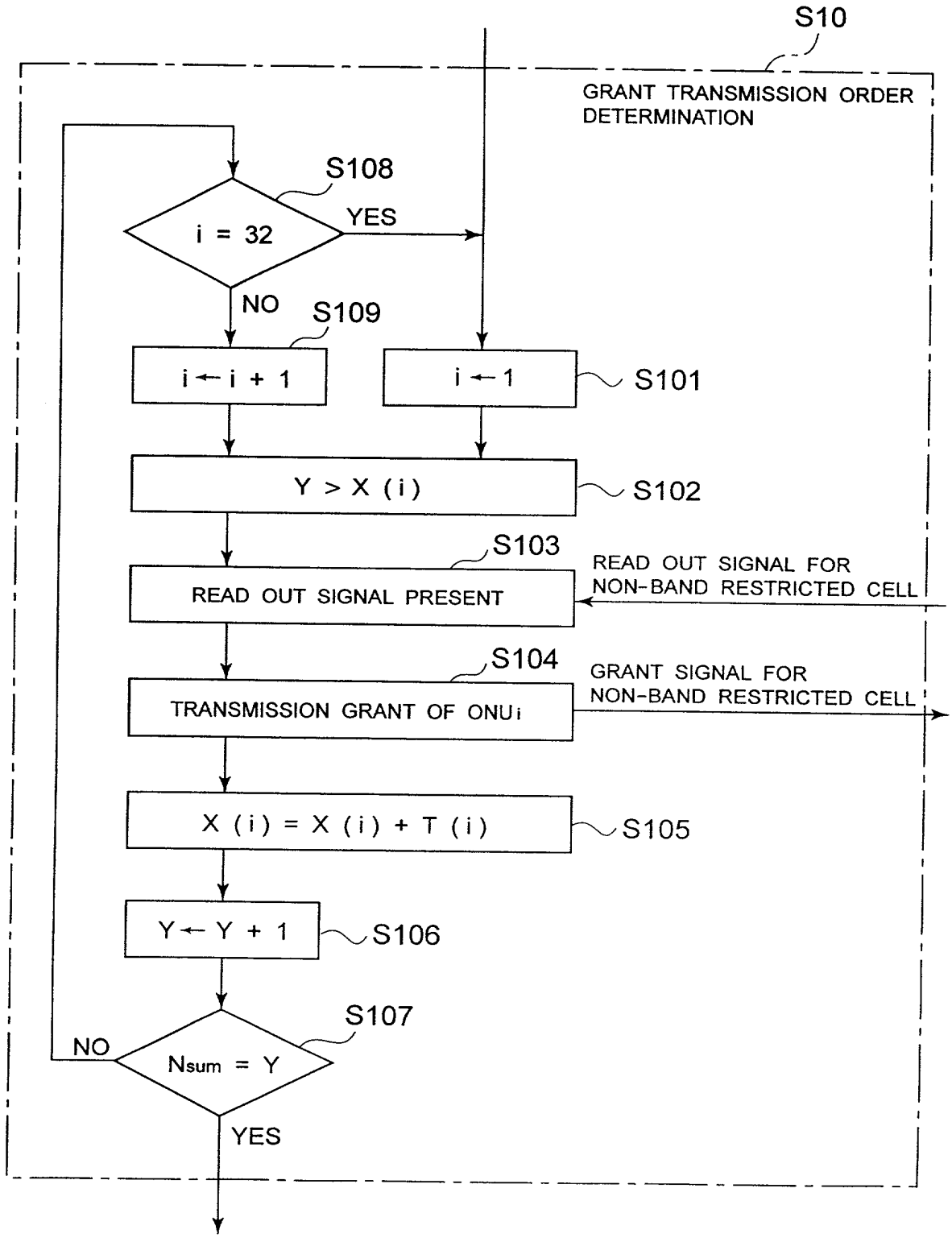

S9
TRANSMISSION PERIOD PER ONU IDENTIFICATION NUMBER DETERMINATION
S95
i ← i + 1
i ← 1
S91
T (i) ← N (i) / T (i)
S92
S93
NO
i = 32
YES
Y ← 0
S94

FIG. 24


S10
GRANT TRANSMISSION ORDER DETERMINATION
S108
i = 32
YES
NO
S109
i ← i + 1
i ← 1
S101
Y > X (i)
S102
S103
READ OUT SIGNAL PRESENT
READ OUT SIGNAL FOR NON-BAND RESTRICTED CELL
S104
TRANSMISSION GRANT OF ONUi
GRANT SIGNAL FOR NON-BAND RESTRICTED CELL
X (i) = X (i) + T (i)
S105
Y ← Y + 1
S106
S107
NO
Nsum = Y
YES

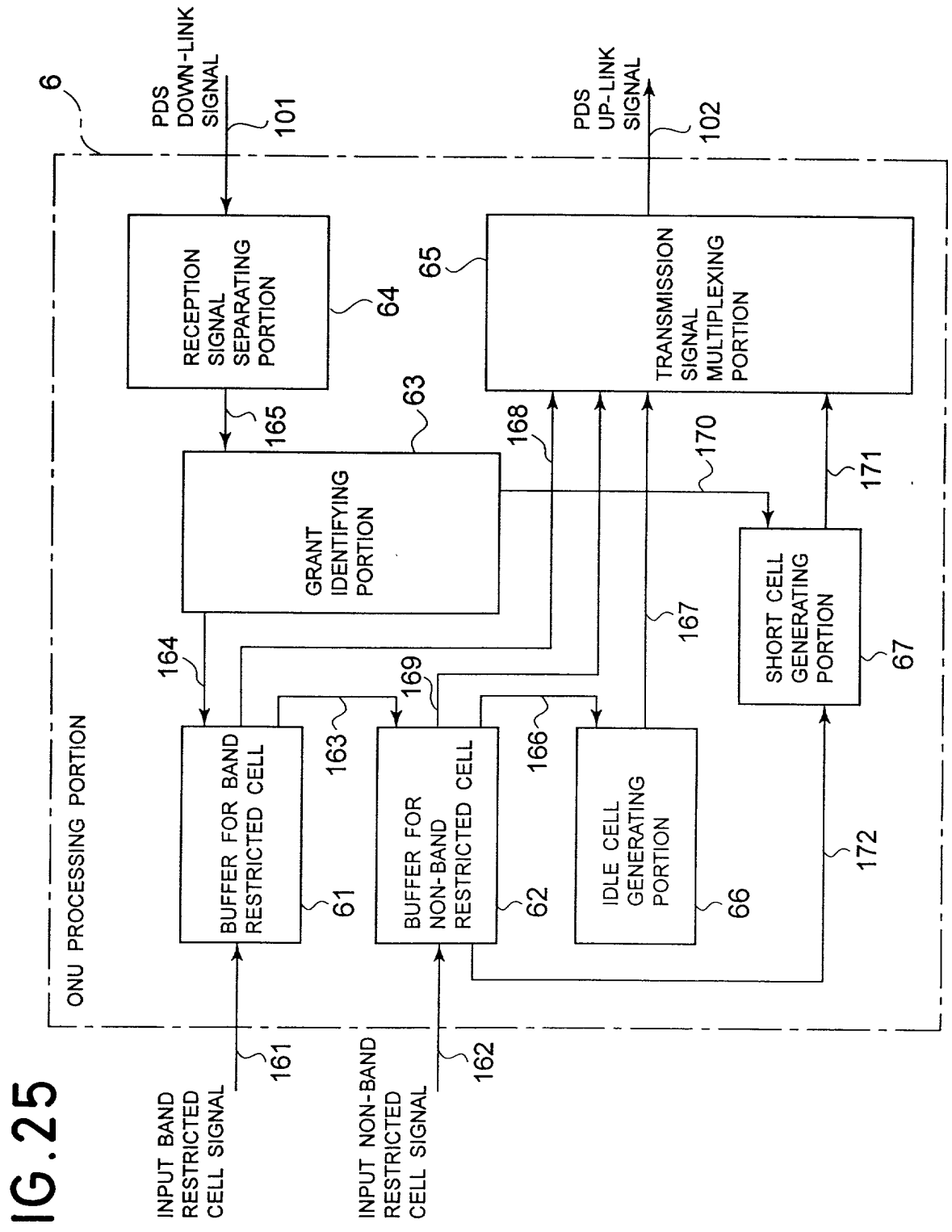
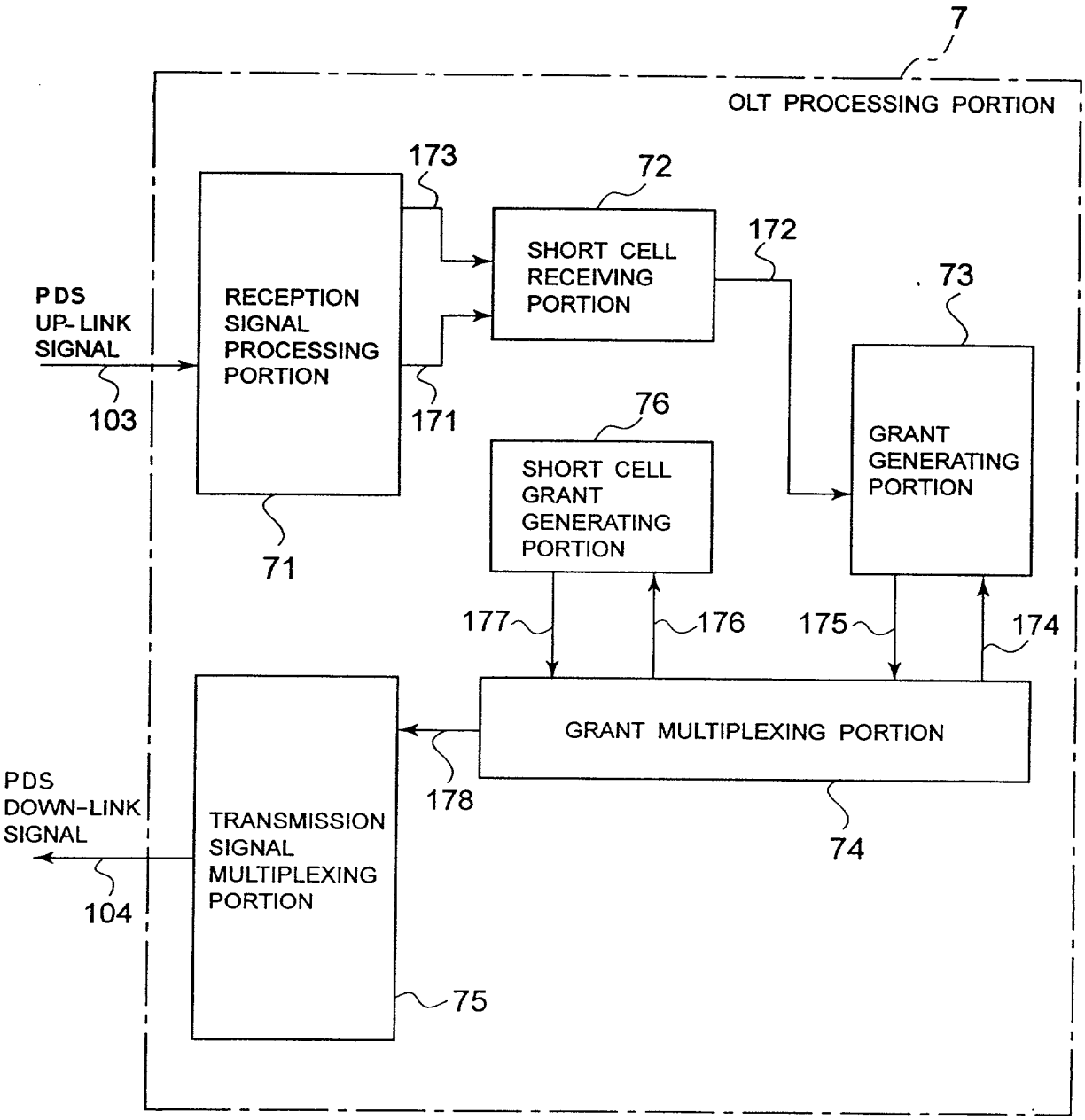

6
PDS DOWN-LINK SIGNAL
101
PDS UP-LINK SIGNAL
102
RECEPTION SIGNAL SEPARATING PORTION
64
65
TRANSMISSION SIGNAL MULTIPLEXING PORTION
165
63
168
170
171
GRANT IDENTIFYING PORTION
164
169
167
SHORT CELL GENERATING PORTION
67
163
166
BUFFER FOR BAND RESTRICTED CELL
61
BUFFER FOR NON-BAND RESTRICTED CELL
62
IDLE CELL GENERATING PORTION
66
172
ONU PROCESSING PORTION
161
162
INPUT BAND RESTRICTED CELL SIGNAL
INPUT NON-BAND RESTRICTED CELL SIGNAL

FIG.25

FIG. 26


7
OLT PROCESSING PORTION
173
72
172
73
PDS
UP-LINK
SIGNAL
RECEPTION
SIGNAL
PROCESSING
PORTION
SHORT CELL
RECEIVING
PORTION
GRANT
GENERATING
PORTION
103
171
76
SHORT CELL
GRANT
GENERATING
PORTION
71
177
176
175
174
GRANT MULTIPLEXING PORTION
178
PDS
DOWN-LINK
SIGNAL
TRANSMISSION
SIGNAL
MULTIPLEXING
PORTION
74
104
75